

XXV.—On *Ranunculus aquatilis* of Smith. By CHARLES C. BABINGTON, M.A., F.L.S., F.G.S., &c.

OWING to the respect in which Sir J. E. Smith is justly held by English botanists, the plants included in the *Batrachian* section of the *Ranunculi* have been considered as forming only two species by all our native authors whose works have appeared since the publication of his 'Flora Britannica.' In that work, following the example of Linnæus, he describes *R. hederaceus* and *aquatilis* as distinct species, including under the latter four species of Ray (Syn. 249.) and Sibthorp (Fl. Oxon. 175.); and it is not a little surprising, that so bold an undertaking, as the destruction of three species, of authors so well known for their attention to the living plants, and for their discrimination of species (although, owing to the low state of descriptive botany, they may not have clearly defined their distinctive characters) should not have attracted more attention from the practical botanists of this country.

For several years I have taken every opportunity of studying these plants in their native waters, and am now fully convinced that *R. aquatilis*, *circinatus* and *fluviatilis* of Sibthorp are truly distinct species, having excellent and clearly distinguishable characters when examined in a living state, although the pressure required in their preparation causes their differences to be less remarkable when preserved in the herbarium. Upon reference to foreign books, it will be found that nearly all the more modern writers have divided the *R. aquatilis* of Smith into two or more species, but that owing to the difficulty of determining upon what characters dependence could be placed, it is only of late years that they have been correctly defined; and the sceptical have been strongly confirmed in their doubts by observing that the learned DeCandolle, who described two species (*R. aquatilis* and *pantothrix*) in his 'Systema', has again formed them into only one in his 'Prodromus'. This result might have been confidently predicted by any person who was well acquainted with the plants; for he has not mentioned a single character which is not extremely variable, founding his distinctions upon some of the leaves being tripartite, or all of them multifid, and upon the gla-

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brous or hispid carpels; points in which each of the plants described below is found to vary, except that tripartite leaves have never been noticed in *R. circinatus*.

The idea that the different forms concerning which we are treating are caused by the plants being placed in stagnant or swiftly flowing water, or upon nearly dry land, was first, I believe, started by Mr. Woodward in Withering's arrangement, and adopted by Smith, DeCandolle, and others; but I have constantly observed *R. aquatilis* and *circinatus* inhabiting, side by side, the same stagnant muddy water, or the same pure and swiftly flowing brook, and yet remaining totally unaltered and remarkably different; I have also gathered *R. fluitans* in perfectly stagnant ditches, quite preserving its specific distinction, and am convinced that the form and mode of division of the leaves will be found to constitute plain and constant specific characters. I am confirmed in this view by Wallroth, who appears to have studied these plants with peculiar care, and by Gaudin, Mertens, Koch, Schlechtendal, Sturm, and others, who have kept the plants separate, and recorded observations similar to my own.

In *R. aquatilis* the submersed leaves (and sometimes, when growing upon mud, all the foliage) are divided into numerous capillary segments, which spread in all directions, so as to form a more or less spherical mass; in *R. circinatus* they are divided into capillary segments, but spread only in one plane, so as to present a thin flat surface with a well-defined circular outline, as if an additional quantity of parenchyma only was wanting to form them into an entire circular leaf, and they have not the slightest tendency to a spherical arrangement; they are also invariably sessile, that is, have only the amplexicaule sheath between their limb and the stem, whilst in *R. aquatilis* they have usually a distinct petiole interposed which is often much elongated. In *R. fluitans* the leaves are upon long petioles, and very much elongated, and repeatedly dichotomous, with a long interval between the forks, the divisions taking a parallel direction and not spreading into a spherical mass, nor yet remaining in one plane surface.

The persistent style also and the shape of the carpels ought to be attended to; in *R. aquatilis* the carpel is usually ovate,

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*R. hederaceus* is distinguished from these by the total want of capillary divided leaves, by having a truly creeping stem giving out roots from every joint, and its few (5—10) stamens; its flowers are usually very small, and the petals narrow and scarcely as long as the calyx; but I possess specimens which were floating upon deep water and whose roots did not reach the ground, in which the petals are broad and much longer than the calyx, yet agreeing in all other respects with this species.

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*R. capillaceus*, "*Thuil.*" *Lois. Fl. Gall.* i. 391.

*b. cæspitosus*. Caulibus erectis brevibus.

*R. pantothrix*,  $\beta$ , cæspitosus, *DC. Sys.* i. 236. (Syn. Sibth. excl.)

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*R. cæspitosus*, "*Thuil.*" *Lois.* i, 391.

*R. Bauhinii*, *Tausch in Ann. Sc. Nat.* (1835.) p. 57?

$\alpha$  and  $\beta$ , *a*. Frequent in ponds, ditches and streams.

$\beta$ , *b*. On mud in places where water has stagnated, but afterwards disappeared.

Stems long, floating upon or near to the surface of the water, throwing out fibrous roots from its lower joints; in *var.  $\beta$ . b.* the stems are numerous, short, erect, much branched, slightly decumbent and rooting at the base, and thereby forming small dense upright tufts. Leaves all more or less stalked with a sheathing stipule-like base, when below the surface of the water divided into very numerous capillary segments, spreading in all directions from their base so as to form a spherical mass; when floating they are three-lobed, the lobes being two or three crenate, or divided into a similar number of segments, which are usually obtuse but sometimes acute; the intermediate lobe has usually three simple divisions, and the lateral ones two, each of which is often again slightly divided into two or three parts; in *var.  $\beta$ . a.* the leaves are all capillaceo-multifid, and in *var.  $\beta$ . b.*, from growing wholly in the air, the segments have a much greater tendency upwards, but still retain the divergent character of the species forming part of a sphere. In *var. a* a somewhat similar structure is sometimes noticed in the intermediate leaves, when growing in water, which is liable to great differences of level, so as to leave the plant at times nearly dry, but in that case the segments are flattened and linear with parallel sides, or slightly narrowed towards their point, and not setaceous. Flowers white, rising above the surface of the water, very variable in size. Petals white, with the base yellow, broad and blunt, with a naked nectariferous pore at their base, always longer than the sepals, which are deciduous, smooth, pale green, elegantly marked with numerous slender dark lines

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Stems long, floating upon or near to the surface of the water, throwing out fibrous roots from its lower joints; in *var.  $\beta$ . b.* the stems are numerous, short, erect, much branched, slightly decumbent and rooting at the base, and thereby forming small dense upright tufts. Leaves all more or less stalked with a sheathing stipule-like base, when below the surface of the water divided into very numerous capillary segments, spreading in all directions from their base so as to form a spherical mass; when floating they are three-lobed, the lobes being two or three crenate, or divided into a similar number of segments, which are usually obtuse but sometimes acute; the intermediate lobe has usually three simple divisions, and the lateral ones two, each of which is often again slightly divided into two or three parts; in *var.  $\beta$ . a.* the leaves are all capillaceo-multifid, and in *var.  $\beta$ . b.*, from growing wholly in the air, the segments have a much greater tendency upwards, but still retain the divergent character of the species forming part of a sphere. In *var. a* a somewhat similar structure is sometimes noticed in the intermediate leaves, when growing in water, which is liable to great differences of level, so as to leave the plant at times nearly dry, but in that case the segments are flattened and linear with parallel sides, or slightly narrowed towards their point, and not setaceous. Flowers white, rising above the surface of the water, very variable in size. Petals white, with the base yellow, broad and blunt, with a naked nectariferous pore at their base, always longer than the sepals, which are deciduous, smooth, pale green, elegantly marked with numerous slender dark lines

*R. pantothrix*,  $\alpha$ , capillaceus, *DC. Sys.* i. 235.

*R. aquatilis*,  $\beta$ , capillaceus, *DC. Prod.* i. 26.

*R. capillaceus*, "*Thuil.*" *Lois. Fl. Gall.* i. 391.

*b. cæspitosus*. Caulibus erectis brevibus.

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*R. aquatilis*,  $\gamma$ , cæspitosus, *DC. Prod.* i. 26.

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2. *R. circinatus*, Sibth. Caule natante, foliis omnibus sessilibus capillaceo-multifidis laciniis in planum orbiculare dispositis tertiusculis abbreviatis 2—3-furcellatis, carpellis transversim rugosis glabriusculis gibboso-obovatis apicula laterali elongata arcuata acuta instructis.

*R. aquaticus* albus, *circinatus* tenuissime divisus foliis ex alis longis pediculis innixis. *Ray*, 249.

*R. aquatilis*,  $\beta$ . *Linn.* 781.

*R. circinatus*, *Sibth.* 175. *Reich.* 719. *Drejer*, 192.

*R. aquatilis*,  $\gamma$ . *Sm. Fl. Br.* ii. 596. *Eng. Fl.* iii. 54. (Syn. DC. excl.) *Hook.* 218.

*R. aquatilis*,  $\delta$ . *stagnalis*, *DC. Prod.* i. 27.

*R. stagnatilis*, *Wallr.* 285. (Syn. DC. excl.)

*R. pantothrix*,  $\beta$ . *Gaud.* iii. 524.

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3. *R. fluitans*, Lam. Caule fluitante, foliis longe petiolatis repetito di- vel trichotomis, laciniis longissimis linearibus parallelis, f. superioribus subsessilibus, carpellis transversim rugosis glabris obovatis apicula laterali brevi obtusa recta instructis.

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